

A Dravidian decipherment of Indus script

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5

Abstract

- The Indus script writing system is described here as a logo-syllabic system with almost unique syllables associated with them. The crucial aspect of the decipherment is the observation that semantic value of numbers are not related to quantifiers but are used as adjectives such
- 10 first/strong/mature etc., through the syllables that are derived out of it. The standalone semantic values of the logo have crucial role to play in deciding the syllabic value of the logo, but it only uses the modified syllabic value in the instances of the text. Although main syllabic value is maintained around it's primary consonant value, the syllables have pluripotency both in terms of semantics and syllables in context, i.e., they have modified vowels and soft consonants (glides).
- 15 This decipherment is not only about syllabary, it also provides complete semantic decipherment as well, uncovering various aspects of the life of Indus Valley Civilization. Most of the seals are about the barter trade transactions and describe from/to addresses, with mode-of-transport indicated in-between. The urn-symbol is deciphered as "ūr" (town/village) with various adjectives preceding it (or infused into the sign) describing the town. The unicorn-seal indicates that it is trade-related
- 20 activity. The fish-signs and arrow signs describe the mode of transport of goods. The goods are indicated by the object before the animal indicating whether it is a food-type or not (perishable goods or not). The decipherment also uncovers aspects other than trade, like marriage and disputes.

Prelims

We list a few acronyms/initialisms that is commonly used in the article:

- 25 IVC : Indus Valley Civilization
DED: Dravidian Etymology Dictionary [1]
M77: MASI 77, Mahadevan [2]
WB: Wells, B., Indus Writing [3]
MVB: M.V.Bhaskar [4]
- 30 DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. Mahadevan has simplified and reduced the number of signs, by considering many of them as variants of the same theme or treating them as identical. For a richer source of symbols and data, please refer to Wells [3] or the character list in NFM Indus Script font.

35 Introduction

Indus valley civilization was contemporary to other civilizations such as the Mesopotamia and Egyptian civilizations with it's own independent system of writing. Each of these systems had their own culture and languages that were unique to their own civilization. It is a great challenge to decipher any one of them without a multilingual Rosetta stone, but such decipherments have been
40 successfully achieved in the case of Linear Elamite [5]. In the case of Indus script it has been well established, through various indirect attempts, that it is closely related in cultural aspects with the ancient Dravidian culture and language. However, broad confusion arises when attempts are made to relate it to an alphabetic system as it seems similar to a complex logo-syllabic system like the Egyptian system of writing. There have been many futile attempts to conjure-up such a relation
45 between the Tamil Brahmi writing system and the Indus script, despite of the fact that the Indus signs have strong pictorial content.

It took a while for the modern alphabets to arrive (around 1000 BCE) and one can expect that the logo-syllabic system of Indus script, like the earlier versions of Egyptian writing system, to be pre-alphabetic/abugida stage, where pure consonants have not yet been crystalized and extracted out of
50 the spoken languages. From this decipherment it seems that the atomic units (signs) of the IVC writing system are logo-syllables, with the high potential for creating homophones, thus reducing the number of signs required for the orchestration of the writing system within the specific context of IVC society and it's trade transactions.

In this decipherment, the author followed the trail left by these signs (like a detective), as it
55 uncovers through internal evidences tracing them one by one. Sometimes serendipity plays a big role in our findings, and all this would not have been possible but for the enormous sign lists and concordance data that has been gathered painstakingly by many reserachers over very many decades, making them freely accessible online. Of course, it also helps if your mother tongue has roots to the very same language and culture, although displaced in time by more than 5000 years!

In the next section we first outline the syllabary of Indus script as it is preceived here. Detailed list of all symbols and their syllabic values are described in a later section on "Syllabic development". After the next section on orthography we briefly describe the skilled artistry of Indus writing system, then the crucial role of Numbers, Clitics and the system of "Learning through pun". In the section after "Syllabic development" we describe a few frequent phrases that emerge out of the
65 corpus with two or three logos. We then classify a few logos under functional ideographic categories (although they are primarily syllables they also have certain ideographic tendencies). Next we outline the crucial aspects of fish signs and their various manifestations. In the section after this we briefly sketch the dominant trade activities and their relative importance and it's implications in the development of a class society. We then go on to decipher several lines of text in
70 the corpus and also seals containing interesting graphical content with their corresponding text in a "Show and tell" section. We end the body of the article with sections about "Overlap with previous work" and "Acknowledgements".

Orthography of the Indus script

75 The logo-syllabic syllabary of Indus will be described here as it is preceived here in use. We try to discern if there are broad rules of orthography in this writing system that we can observe. We will start with some simple number systems and see how they can prefix or suffix to other symbols/syllables in the system.

To begin with we use a simple rule that there is one and only one syllable to which each of these signs get assigned to. This is a simple rule to follow and it can be easily be discerned if it breaks.
80 We will now describe the other patterns or rules that we observe.

Let us now consider the M77 sign-373 ○ to which we assign the syllable “pa” (from “pakaḷ”, meaning the sun or daylight). For the sign-86 | we assume that it has the value “mutaḷ” (the primary one) and then see how it applies to the sign-375 ⊙. We believe that this value is indicated by the sign-376 ∅ that has a tooth attached to it. So we have:

85 pa + mut-aḷ = paḷ

Now let us consider the sign-391 ⊗, a sign that we know has strong correlations with elephant seals from MVB [4] findings, so we assign the value “paḷḷa” that also has close proximity to “paḷ”, but we can see there are three cross-lines and/or six small pieces, making it more like “pillir”.

90 There is also another possibility that this is decided by DED 1045 ṁṭai/ṁṭa, a metal badge that is applied to the forehead of the elephant. So we observe that although broad rules are applied, there are also *ideosyncracies* of local culture that also provide a few interesting twists and turns, but in general it tries to confirm to some broad outlines.

We will now move to the interesting sign-287), which we have assigned the value

95 “valai/valai” after looking at it’s close cousins sign-298))) and sign-290 𐎶 that has five strokes affixed to it’s top-right.

))) = 𐎶 = vala + |||| = valai

Doubling on that we get,

))) = valai + |||| = valai + ai = valaianjih or valaicci or valayacci

100 If sign-290 has three strokes on top we can get,

𐎶 = valai + ||| = valai + mu = valaiyam

Semantically vala/vala is “right”, “curved” as the symbol right parenthesis and when combined with “5” it becomes valai.

We also observed for M77 sign-62 (𐎶) that we can assign value “vālai” (scabbard fish that has sharp teeth). The sign-295 𐎶 “iru-valai” sounds similar to “ēri-vālai”. These signs also indicate that such deformation of the base syllable is possible, i.e., “valai” ≈ “vālai” and “ēri” ≈ “iru”. Of course, high homophony is one of the crucial principles in creating a script with minimal number of signs.
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Next, we look at sign-81 (𑀓) that we assign the value “valai-puri”, while we assign sign-63 (𑀓𑀔) the value “kanni-pori” (DED 1183, 4538). This then decides “kanni” for fish-sign and “puri” ≈ “pori” for bird (quail) sign.

Based on these successes we decide to take a look on the other variants of fish-sign. For sign-70 (𑀓𑀔) we apply “kāl” (DED 1483 assigns the semantic value of “cart”) and for sign-72 (𑀓𑀔) “kōl” (DED 2238 assigns a semantic value of “raft/float”). One might ask why not assign the values the other way around, but the important clue comes from the cross-line that looks more like paddle/oar. Yes, again there are some *ideosyncracies* that comes with it.

We now move to sign-328 (𑀓𑀔) for which we assign the value “ū/u/va”. So for the sign-332:

$$\text{𑀓𑀔} = \text{𑀓} + \text{𑀔} = \text{va} + \text{ai} = \text{vai}$$

Similarly we also get the very important sign-342:

$$\text{𑀓𑀔} = \text{𑀓} + \text{𑀔} = \text{ū} + \text{iru} = \text{ūr}$$

Next, we get on to double affix, sign-336 (𑀓𑀔):

$$\text{𑀓𑀔} = \text{𑀓} + \text{𑀔} + \text{𑀔} = \text{u} + \text{mu-ta-l} + \text{𑀔} = \text{uṭaṇ} \text{ (DED 945)}$$

Here sign-374 (𑀔) takes the value “ṇ” (from droplet, “nīr”) and sign-336 (𑀓𑀔) (uṭaṇ) has the ideographic association with mortar & pestle (a marriage ritual association as well)! In the M77 concordance list the sign-321 (𑀓𑀔) is immediately preceded by sign-336 (𑀓𑀔). As the two sign-374 (𑀔) are joined together by a string, a value of “ñāṇ” (DED 2908 “string”) will be the correct one:

$$\text{𑀓𑀔𑀔} = \text{uṭaṇ} + \text{ñāṇ} = \text{uṭaṇ-ñāṇ} \text{ (marriage agreement)}$$

Although the picture speaks thousand words there are also hints of syllables through micro-typography in Indus script. Consider sign-402:

$$\text{𑀓𑀔} = \text{𑀔} + \text{𑀔} = \text{na} + \text{ṭu} = \text{naṭu}$$

$$\text{𑀓𑀔} = \text{𑀔} + \text{𑀔} = \text{nāl} + \text{naṭu} = \text{nāṭu}$$

$$\text{𑀓𑀔} = \text{𑀔} + \text{𑀔} = \text{mutal} + \text{ni} = \text{maṇi}$$

$$\text{𑀓𑀔} = \text{𑀔} + \text{𑀔} = \text{ni} + \text{mutal} = \text{aṇiyal}$$

and now let us consider another sign-51:

$$\text{𑀓𑀔} = \text{𑀔} + \text{𑀔} + \text{𑀔} = \text{mu} + \text{iru} + \text{an} = \text{māran}$$

with an additional twist as “māran” twists and looks back (a feature observed by Mahadevan and passed-on through personal communications by MVB).

Of course, we can also say as additional double-emphasis things like:

mu-kula-iru-vaṇi-māran

(triple generation true path Maran)

Now on to another topic:

M77 No.	Glyph	Roman	Tamil
169	𑌵	nilam	நிலம்
171	𑌶	nilai	நிலை
174	𑌷	iru-nēla	இருநெல்
88	𑌸	nal-iru	நல்-இரு

These are characters that seems to stand-out (pun intended with “nīl” being DED 3675 “to stand”), i.e., decided more by the context of IVC barter transactions and not by any complex orthography rules.

So as a broad outline we can say that the signs in IVC script are strongly associated with unique syllables and that the IVC writing system allows plenty of ways to mutate them in many ways from their base ideographic glyph values. However, it is not clear that in the case when there are multiple affixes applied, then which comes first, i.e., whether a base glyph applies first etc. In general one could assume it flows from right-to-left and top-to-bottom, but I suppose there are many exceptions that are decided by the context.

For example the famous sign-116 𑌶𑌶𑌶𑌶 can take the value “nellai/nallai” but the other-way around can also be “ayaḷ” is quite unlikely in the IVC transaction context. Sign-112 𑌶𑌶𑌶 works as “munṇāḷ” but in the semantics of IVC transactions “ñāḷam” works better. Of course, both are possible and even within the context of IVC “munṇāḷ” might be a better choice in some particular case.

The non-affixed pure IVC signs have unique syllables associated with them, which have either single consonant and two consonants at the most. The combining rules usually seem to drop the middle consonants, and of course the vowels are modified as pertinent to the situation.

In some cases the components may not be a disjoint merger but a continuous merger (welding) of the two as in this case:

𑌶𑌶 = 𑌶 + 𑌶
tarī = tan-vaṛi

Finally as an interesting remark I would like to bring to attention a nice little sign-310 𑌶𑌶 with a probable value of “vilaviḷa” (DED 5424) that sounds similar to “vavvāḷ” (long-tailed fruit bat?) as used in this line of text:

𑌶 𑌶 𑌶𑌶𑌶𑌶 𑌶𑌶

Trembling with fear “vilaviḷa” cognates well with “eerie bat”, so we try to decipher this line.

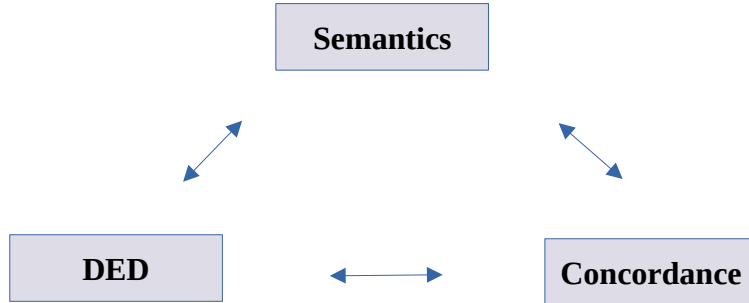
Vilamban trembling with fear “loading” (māṭṭu, 𑌶) the bow, but what’s to the right of vilamban, a tiger? Tiger trembling or the hunter trembling? So we notice that it could be:

ciruttai = cīpu + iru-tai = 𑌶𑌶 + 𑌶 (right-to-left) = 𑌶𑌶

This describes the process of discovery through an example. As a broader generalization we could insist for Dravidian decipherment that the following triangle commute (i.e., more like walking on three legs or squash on three walls):

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180



We illustrate this with a line of text:

𑌕 𑌕𑌕 𑌕𑌕 𑌕𑌕

185 valan.ai-iru.valai-varvan.ur-anjih

To fit it into the context we need to modify this to:

valamai-iru.vilai-vuravan.ur-anjih

வளமை இருவிளை உழவனார் வஞ்சி

Semantics:

190 Fertile highly productive farmer's town paddy

or

Fertile double-crop farmer's town paddy

We now show how consonants and vowels express themselves in this system, but since it is not an alphabetic system, they don't carry any special importance by themselves as there are many more

195 syllables with single and double consonants that are used to complete the language.

Consonants and their signs

Consonant	M77 sign	Glyph	Roman	Tamil
ka (க)	59	𑌕	kaṇṇi	கன்னி
ce (சே)	76	𑌕𑌕	cēval	சேவல்
ta (த)	216	𑌕𑌕𑌕	tanṭi	தண்டி
pa (ப)	373	𑌕𑌕𑌕𑌕	pakal	பகல்
pu (பு)	78	𑌕𑌕𑌕𑌕𑌕	pūr	பூர்
pū (பூ)	54	𑌕𑌕𑌕𑌕𑌕𑌕	pū	பூ
ma (ம)	242	𑌕𑌕𑌕𑌕𑌕𑌕𑌕	māṭi, māṭu	மாடி, மாடு

Consonant	M77 sign	Glyph	Roman	Tamil
mē (மே)	197	𑌢	mēl	மேல்
mu (மு)	86	|	mu	மு, முதல்
mū (மூ)	89	|||	mū	மூ, மூனு
na (ன)	374	𑌤	na	ன
nā (நா)	95	||||	nāl	நால்
r (ர)	87	||	raṇṭu	ரண்டு
va (வ)	328	U	va	வ
ṛa (ரூ)	400	𑌦	ṛa	ரூ
ṛu (ரூ)	110	|||||	ṛu	ரூ

200

Although vowels and glides can be arbitrarily mutated, modified or introduced in to the system while combining with the base syllable, the vowels are very much required at the beginning of a word. We list a few here.

Vowels and their signs

Vowel	M77 sign	Glyph	Roman	Tamil
an (அ)	1	𑌧	an	-அன்
āṭu (ஆ)	50	𑌨	āṭu	ஆத்து ஆடு
īla (இ)	323	𑌩	īla	இல
ūr (ஊ)	342	𑌪	ūr	ஊர்
eṛu (ஏ)	110	|||||	eṛu	ஏழு

Skilled artistry of Indus script

At the core of Indus script lies the mastery of a skilled metallurgist (𑌦). We will illustrate this with these with few examples:

𑌦𑌧𑌨𑌩 = 𑌦𑌧𑌨𑌩 = vēl-aṇi-nuṛan-ūr = வேல்அணிநுழனூர்

The semantic meaning being the town with tailors, jewellery and hunting professions.

𑌧𑌨 = | 𑌧 𑌨 || || = mu-iru-mēl-pēr-ul = மூவிரு மேல்பொருள்

In this case the semantic meaning could be the mighty great guardian of the township (elevated to kings and gods at later times).

205 Some important townships

210 This is just indicative of the various kinds of townships and professions, and a deeper quantitative study is required to obtain their relative importance. What is interesting is that the last one in the list is farmer's town, which doesn't count really as a town, but in Dravidian languages, the term "ūr" seems to cover what we call "village" also. Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. For a richer source of symbols and data, please refer to Wells [3]. Some of these signs here have been identified earlier by other authors, so a proper acknowledgment of these facts will be added later on in a separate section.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
342	𑌵	ūr	752	town	ஊர்
347	𑌶	velūr	-	hunter's town	வேலூர்
358	𑌷	chevūr	-	bronze worker town	செவ்வூர்
351	𑌸	vel-nuṛan-ūr	-	hunter-cloth worker town	வேல்நுழுவூர்
?	𑌹	che-palla-ūr	-	bronze-elephant worker town	செவப்பல்லூர்
355	𑌺	vel-palla-ūr	-	hunter-elephant worker town	வேல்பல்லூர்
361	𑌻	che-ko-ūr	-	herder-bronze worker town	செங்கோவூர்
372	𑌼	vel-aṇi-nuṛan-ūr	-	hunter-jeweller-tailor town	வேல்அணிநுழுவூர்
15	𑌽	uṛavūr	688	working, farming town	உழவூர்

Numbers

215 Numbers are treated separately, but they are just like other glyphs, easily welded and affixed to other glyphs, producing a plethora of possibilities. However, they are an important pointer to the fact that the actual standalone semantic value (in this case the numeric number) of the glyphs may have very little to do with its semantic value.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
86	𑌾	mutal, -al	4950	one, primary	முதல், -ல்
87	𑌿	-ar, -ir, iru-	474, 481	two, great, eminence	ரண்டு, -இர், -ர், இரு-
89	𑍀	mū-, mūn-	5052	three	மூ-, மூன்-
95	𑍁	nal-, -nāl, nalla-	2912	four, good	நல்-, -நால், நல்ல-
96	𑍂	-ai	2826	five, unity	-ஐ
108	𑍃	aru-, -ar	2485	six, river, fort	ஆறு, அறு

M77 Sign	Glyph	Syllable	DED	Description	Tamil
110	||||	eru-, -eru	910	seven, rise, fertile	ஏழு, -எழு
Application of above phonemes					
112	||||	nalām, ñālam, munnāl	2913	land, healthy, before	நலம், நாலம், முன்னால்
116	||||	nallai, nellai	-	rice	நல்லை, நெல்லை
121	||||	nal.nel.āl	-	good rice person	நல்நெல்லான்
120	||||	mu-munamum	-	three generations back	மும்முன்னோனும், மும்முன்னமும்
119	||||	mu-munnor	-	two generations back	மும்முன்னோர்
107	||||	mūri, mūrā	5041	bullock, buffalo	மூரி, மூரா

Clitics

- 220 Clitics provide sentence structure (the subject and the object). The default reading order is right to left, but before the clitic 𑌖 (sign 99), the reading is supposed to be left to right (but this doesn't seem to be followed strictly by writers of IVC script).

M77 No.	Glyph	Syllable	Tamil
97	𑌖	-il, -da, -ta, -in	-ட, -டு, -த, -து -இல், -இன்
99	𑌖	-ra, -ru	-ர, -ரு, -ற, -று
123	𑌖	-yar, -yin	-யர், -யார்
344	𑌖	ūr-ār	ஊரார்
343	𑌖	ūr-il	ஊரில்

- 225 The Indus writing is not without it's own inaccuracies, either by themselves or captured by mistake by the scribes. We noticed a few cases where the clitic sign-99 𑌖 has been captured as sign-87 𑌖, which in those particular instances seem more like a case of sign-99 rather than sign-87. However, it must be mentioned that there are very few mistakes in the Mahadevan's corpus (both in intent and purpose), which has done a nice balancing act between variety and simplicity, thus making it easier for decipherment. For a slightly different opinion from Mahadevan on the list of signs is Wells [3].
- 230 We follow Mahadevan's sign list and numbers here, but it must be possible to do it using Wells [3] list of signs and sign-number as well without any loss of generality.

Learn through pun

Following are an indication of the pun that abounds in Indus script, which is termed as the "rebus principle". Of course, it only makes sense if your language is close to ancient Dravidian. For deeper

235 understanding you may have to refer to some of the sign values below this in the section on “Syllabic development”. We only sketch a few, but the Indus script syllabary abounds in such pun. The reduction of number of glyphs required for a writing system for Dravidian language is very much dependent on prudently choosing glyphs that provide highest possible homophony.

M77 Sign	Glyph	Syllable	DED	Description	Tamil
298	)))	valai = vala+ai	5267, 5288	) = vala+5	வல+ஐ=வலை
	Right-parenthesis is “vala” (curved as well as right) in Tamil and “vala” + “ai” = “valai”. “vala” is curve, as well as “right”, which fits well with description of right parenthesis. Also,))) can be further expanded as “valaicci” or “valayacci” or “valayanjih”.				
62	(𑀓)	valai-kanni	5379	scabbard fish with fang-like teeth	வாளை கன்னி (மீன்)
	The fish “vālai” is known as the scabbard fish that has sharp teeth. A nice tooth is drawn at the top to elucidate the learning. This explains that the right-parenthesis sign-287 carry the phonetic value “valai”				
295	)𑀓	eri-valai	902	Another sharp tooth fish	ஏரி வாளை (மீன்)
	A fresh water shark, Wallago attu , also known “eri-valai”, a pun again on the word with rebus equation: “vālai” ≈ “valai”. The prefix “eri” comes from “two” or “iru”, leading to one more rebus equation: “iru” ≈ “eri”.				
63	(𑀓𑀓)	kanni-pori-valai	-	Trapping of birds	கன்னி-பொறி-வலை
	This learning tablet defines the phonetic value of fish as “kanni” and the bird as “puri” by defining it through a polysyllabic pun as “kanni-pori” with a parenthetic “valai”. The “kanni-pori” in Tamil is “trapping”.				
64	𑀓𑀓𑀓	valai-kanni	-	The clitic reverses reading order	கன்னி-பொறி-வலை
	The clitic sign 64 reverses the reading order to the right of it. This learning script defines that.				
376	𑀓𑀓𑀓	pal	-	teeth	பல்லு
	A teeth is indicated by the protruding teeth effect, just like in the fish teeth.				
57	𑀓𑀓𑀓	irumpu	486	iron	இரும்பு
	Now we have triple pun: iru-pu (two insects) ≈ erumpu (ant) ≈ irumpu (iron)				
181	𑀓𑀓𑀓	kottu	2065, 2064	pour (sting)	கொட்டு
	We can see pincler claws are indicated to show “sting” and “pour” are homophones in Dravidian “kottu”. The stinging honey-bee also is supposed elucidate connotations of “honey” that pours (kottu) from the beehive.				
310	𑀓𑀓𑀓	vila-vila	5424	tremble with	விலவில

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				fear	
	This cognates with “vavvāl” (DED 5370), probably a long-tailed fruit bat, with an eerie shivering scene that it creates.				
303	) (	iṭa,	432	cleft, gap, split, crack open , slit, breach, chasm	இட
Also works as “iṭaveli” ≈ “iṭai-valai”.					

240 Signs and affixes

Just to give a flavor of the decipherment here we group few signs under base/affix geometry. In some cases there could be more than one affix. For more details see next section “Syllabic development”.

Sign ○

Affix Base	|	||	|||	||||	|||||	Ψ	○	◊	○ |	人○	|||| - ||
○	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
pa	pal	para	pammu	nal-para	pallā	vēl-appa	pān	cirappu	pānal	pān-an	nal-pallar
பா	பல்	பற	பம்மு	நல்பற	பல்லா	வேலப்ப	பாண்	சிறப்பு	பானல்	பானன்	நல்பல்லர்

245 Sign U

Affix Base	|	||	|||	||||	| ○	| ○ ||||	Ψ ||	- ||	✂ † Ψ
U	U	U	U	U	U	U	U	U	U
ū	val	ūr	ūm	vai	uṭaṇ	uṭai	velūr	chevūr	vel-aṇi-nuṇan-ūr
உ	வள்	உளர்	உம்	வை	உடன்	உடை	வேலூர்	செவ்வூர்	வேலணிநுழுவூர்

250 Sign ✕

Affix Base	|	|◊	||||	||	◀	|||	◊	-	✕
✕	✕	✕	✕	✕	✕	✕	✕	✕	✕
ta	taḷ	tan	tai	irutai	ciṛuttai	mumutai	tāri	todu, toṭu	tāṇ
த	தள்	தன்	தை	இருதை	சிறுத்தை	மும்முதை	தாழி	தொடு	தான்

Sign ✧

Affix Base	|	|	^	^	||	|||
✧	✧	✧	✧	✧	✧	✧
kanni	kāl	kōl	peru-kanni	peru-kaṇai	kōnda, gōnde	kalam
கன்னி	கால்	கோல்	பெருங்கன்னி	பெருங்கணை	கொண்ட, கோண்டே	கலம்

Sign ✎


Affix Base	|	||	| - |	✎	-	^	|	||| - |
✎	✎	✎	✎	✎	✎	✎	✎	✎
an	āl	aṇṇan	kāvalan	naṭṭan	uṛavan	kīrṛān	mutalvan	nal-mutalvan
அன்	ஆள்	அண்ணன்	காவலன்	நாட்டான்	உழவன்	கீழன்	முதல்வன்	நல்முதல்வன்

Sign ✧

Affix Base	✧	||||	|||	✕	甲	⊕	◊
✧	✧	✧	✧	✕	✧	✧	✧
kō	kōṭṭa, kōṭu	kōṭai	kōṭṭam	nāl-vaṛi-kōṭai	nērcira-kō	pallar-kōṭṭa	kōṭai-vaṛi
கோ	கோட்ட, கோட்டை	கோட்டை	கோட்டம்	நல்வழி-கோட்டை	நேர்சிற-கோ	பல்லர் கோட்டை	கோட்டை வழி

	கோட்டு						
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Sign)

Affix Base	180°	◦	◦ 180°	- 180°	90°	270°	
)	()	()(	U))
valai	iṭai	valaiyan	iṭaiyan	iṭa	kuṭi, kuṭai	ū	iru-valai
வலை	இடை	வலையன்	இடையன்	இட	குடி, குடை	உள	இருவிளை

255

Sign ◦

Affix Base	|	|	|	||	||	|||	|	|	≡
◦	↗	↘	↖	↗↘	↘↗	↗↘↖	↗↘↖↗	↗↘↖↗↘	↗↘↖↗↘↖
-n	nāṭu	aṇiyal, maṇi	nullāṇ, nuṇan	ñāṇ	nan	nannu, nannan	nalnelāl	nan-mutal	nāṇkuṇu
ன்	நாடு	அணியல், மணி	நுளாண், நுழன், நுழம்பு	நாண்	-னன்	நன்னு, நன்னன்	நல்நெல்லான்	நன்முதல்	நன்குழு

Syllabic development

We outline from top to bottom how the syllabary is slowly developed from simple to complex glyphs. Happy journey!

M77 Sign	Glyph	Syllable	DED	Description	Tamil
1	𐌵	an	131, 132	person	அன்
	𐌵𐌵	an(n)-an	131, 132	brother	அண்ணன்
2	𐌵|	kāvalan	1417, 1416	security guard	காவலன்
25	𐌵|	mutalvan	4950	chief	முதல்வன்
26	𐌵|	nal-mutalvan	-	good chief	நல்முதல்வன்
3	𐌵	āl	399	servant, slave, soldier, messenger	ஆள்
4	𐌵	natt-an	3638	country man	நாட்டான்
5	𐌵	natt-ar-an	3638	country rules	நாட்டாரன்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
6	𑌵	kompan	2115	clever man	கொம்பன்
7	𑌶	val(i)-an	5276	skilled man	வலியன்
162	𑌷	vēl, vėl	5545, 5536	chief, spear, trident	வேல்
8	𑌸	vēlan, vėtan	5545, 5368, 5527	chief, lance fighter, hunter	வேலன், வேடன்
9	𑌹	valai-vēlan, valaiyan	5288	animal trapper	வலையன்
12	𑌺	uṛavan	688	farmer	உழவன்
13	𑌻	uṛavāl	688	farm worker	உழவாள்
14	𑌼	per-uṛavan	688	big farmer	பேர் உழவன்
15	𑌽	uṛavūr	688	working, farming town	உழவூர்
35	𑌾	valaiyan	5288	Trapper, fisherman	வலையன்
41	𑌿	kīṛān	1621	poor	கீழான்
42	𑍀	pallan	3986a	mahout	பல்ல(வ)ன்
54	𑍁	pu	4345	flower, insect, flourish, bloom, create	பூ (பூச்சி)
55	𑍂	pol	4550	flowering, flourishing, blooming, creating	பொலி, பொலிவு
374	𑍃	-n	1159b, 3621, 3621a	night, bug	நீர் (துளி), (ப)னி, நள், நல்லு
410	𑍄	ñāṇ, nān	2908, 3639	string, me	நாண், நான்
415	𑍅	nānnan	2908, 3639	twiner	நாணன்
417	𑍆	nalnelāl	-	Good farmer	நல்நெல்லாள்
412	𑍇	nāñkuṛu	2906	earthworm	நாண்குழு
186	𑍈	kūru, kuru	1924, 1921, 1782	section/ division/share, to proclaim, brilliant	கூறு
299	𑍉	ida, idai	449	hip, left	இட-, இடை
301	𑍊	idayan	450	herder, herdsman	இடையன்
287	𑍋	vala-, vaḷai	5313, 5314, 5288	bent, trap, right, net	வல, வள, வலை, வளை
298	𑍌	valaicci, valaiyacci	5288	surround, trap, hunter	வளைச்சி, வலையச்சி
293	𑍍	valaiyan	5288	animal trapper	வலை வேலன்,

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				(short form)	வலையன்
303	)(	iṭa, iṭavai	432, 434	narrow way	இட, இடவை
186	𑌕	kutai	1714	notch at end of bow	குதை
312	᳚	kuṭi, kuṭai	1655, 1660	house, family, lineage, hollow, cavity, penetrate	குடி, குடை
313	᳛	kuṭir	1655	house, family	குடிர்
314	᳜	kuṭima	1655	house, family	குடிம
315	᳝	kuṭi-ēru	1655	immigration	குடிஏறு
393	𑌕𑌕	pallar-kuṭi	1655	mahout hamlet	பல்லர்குடி
328	᳞	vu	651, 761	ooze, mortar	வ, உ, ஊ
?	᳟	vala, vala	5304	strong, fertile	வல-, வள-
32	𑌕𑌕	uvan		person between two	உவன்
330	᳠	ūm (ūmaṇ)	748	to fly (owl)	ஊம் (ஊமன்)
332	𑌕𑌕	vai	5549-53	to stay, straw of paddy, to abuse, sharp	வை
336	᳡	uṭaṇ, valaṇ	945	with, consent, immediately	உடன், வலண்
337	᳢	uṭai	593	wealthy	உடை
342	᳣	ūr (ural, uri)	752 (651, 708)	town, village	ஊர் (உரல், உறி)
347	᳤	vēlūr	-	hunter's town	வேலூர்
358	᳥	cevūr	-	bronze worker's town	செவ்வூர்
344	᳦	ūr-ar	-	important sign with clitics	ஊரார்
343	᳧	ūr-il	-	important sign with clitics	ஊரில்
373	○	pa	3805, 4016, 4124, 3884	sun, pot	பகல், பள்ளம், பாணை, பண்
375	①	pal, pala	3986a	teeth, many	பல், பல
386	②	poli, poḷi	4550, 4560	prosperous, chisel	பொலி, பொளி
379	③	pammu	3934	to baste, to yarn	பம்மல்
391	④	pallā	3986a, 1045	elephant	பல்லா (யாணை)
Depicted by the ornamental oval-shaped plate that is fixed on it's forehead					
392	𑌕𑌕𑌕	nal-pallar (nalla-palla-iru)	-	good mahout	நல் பல்லர்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
403	𑌕	parai, parru	4031, 4032, 4034	announcement (sale) with a drum beat	பறை, பற்று
407	𑌕𑌕	pulam	4303	arable land	புலம்
406	𑌕𑌕	paḷapaḷa	4012	glittering, well-oiled	பளப்பள
404	𑌕𑌕	nal-parai		good announcement	நல்ல பறை
387	𑌕	vēlappa		worker, hunter	வேலப்பன்
389	𑌕	pañ-nilam	3837	ploughed land	பண்ணிலம்
254	𑌕	paṭi, paṭṭi	3848, 3850, 3868	hamlet, village, settlement, rest, roost, step gradee, rank	படி, பட்டி
216	𑌕	tan, t̃an	2946, 3188, 3110	earthen pot	தன், தண் (தண்டி), தவளை
217	𑌕𑌕	toḍar, tod̃u, toṭu	3480, 3482	touch, begin, join, to wear, dress-up	தொடு
53	𑌕	tāvu	3177	jump, luxuriant, tread gently	தாவு, தவளை
222	𑌕	tal, tol	3123, 3105, 3516	obstruct, stop beat, crush, old, ancient	தள், தொள்
223	𑌕	mumuta	-	grand-parent	மும்முத
229	𑌕	taṛ, tāṛi	3178	bow down	தாழு, தாழி
36	𑌕	tan	3045	cold, water	தண் (தண்ணீர்)
?	𑌕	pān	4068	song, melody	பாண்
396	𑌕	pāṇal	4071	rice-field	பாணல்
31	𑌕	pāṇan	4068	tamil bard	பாணன், பாடுபவன்
59	𑌕	kaṇ, kanni	1159a, 1166, 1168, 1417, 1483	bamboo raft, trap, trapper	கண், கன்னி
60	𑌕	nalla-kanni	-	good vehicle, good trapper	நல்ல கன்னி
67	𑌕	kondu, kōnda, gōnde	2053, 2216	bull, with	கொடு (கொண்டு), கோண்டே, கொண்டே, கொண் ட
72	𑌕	kōl	2238	boat, raft	கோல்
70	𑌕	kāl	1483	cart	கால்
65	𑌕	peru-kanni		big boat, big cart	பெருங்கன்னி

M77 Sign	Glyph	Syllable	DED	Description	Tamil
75	𑌕	peru-kaṇai	1404	intense, abundance	பெருங்கனாய்
69	𑌕	kaṇṇal	1305, 1415	vessel, ship	கண்ணல்
66	𑌕	nal-peru-kanni	-	great good gentleman	நல்பெருங்கன்னி
66	𑌕	nal-peru-kanni	-	great good gentleman	நல்பெருங்கன்னி
58	𑌕	muttu	4959, 4932, 4957	pearl, excellent, praiseworthy	முத்து
78	𑌕	para, purā, pura, pūr, porī	4020, 4334, 4374, 4603	pigeon, dove, quail, chicken	புறா, புற, பூழ், பொரி
77	𑌕	paraṇ-	4020	birds	பரண்- (பறந்தூர்)
80	𑌕	parapurai	3949	to spread (message through pigeon?)	பறப்புறை
81	𑌕	valai-porī	-	trapping bird	வலைபொரி
319	𑌕	mura	4977	snail, curl	முற, முறை, முறுக்கு
134	𑌕	peru, pēr	4411	big, large	பெரு, பேர்-
204	𑌕	perum	-	large	பெரும்
209	𑌕	peru-mutal	-	large primary	பெருமுதல்
210	𑌕	perum-mutal	-	large primary	பெரும்முதல்
206	𑌕	mu-perum		mature large primary	முப்பெரும்
205	𑌕	nāl-kompu, nāmpu	2115, 3649	good clever, sprout of millet	நால்கொம்பு, நாம்பு
261	𑌕	kō	2177, 2178	mountain, gentry	கோ, கோட்டை
Origin of the word “kō” could be the Gond people (gōnde, DED 2216) of the mountains, reinforced by the West wind, from western practice of having kings in Sumeria					
30	𑌕	kōvan		herder, herdsman, gentry	கோவன்
Cattle class that eventually becomes the ruling gentry					
267	𑌕	kōṭṭa, kōṭu	2207, 2053, 2203, 2200	gift, munificence, fort, gentry (west wind, western practice of having kings in Sumeria), horn	கொட, கோட்ட, கொடு, கொம்பன்
272	𑌕	kōṭai, kōṭai	2207, 2049	fort, gift	கோட்டை

M77 Sign	Glyph	Syllable	DED	Description	Tamil
271	𑌕	kōṭṭam	2058	cattle-shed	கோட்டம்
244	𑌕	aru, ārru, arai, araṇ	317, 407, 322, 201	strong, dwellment, camp, room, castle	அறு, ஆறு, அறை, அரண்
242	𑌕	māṭi, māṭu	4796a, 4798	mansion, terrace, ox	மாடி, மாடு
197	𑌕	mē, mēṭu, mettai	5086, 5058, 5069	top, terrace	மேல், மெத்தை
198	𑌕	mē-mu	5086	higher excellence	மேழு
199	𑌕	mē-vēl	5086	excellent hunter	மேவேல்
200	𑌕	nal-mē	5086	good excellence	நல்மே
402	𑌕	nāṭu	3638	country (as a contrast to forest)	நாடு
245	𑌕	taṭṭi, taṭṭu	3036, 3039	cloth, wooden frame, hammer, tap	தட்டி, தட்டு
296	𑌕	vaṛi	5297	way	வழி
149	𑌕	nālvaṛi	5297	cross-road	நால்வழி
297	𑌕	aruvaṛi	5297	six-way crossing	அறுவழி, ஆறுவழி
135	𑌕	peruvaṛi	5297	big way	பெருவழி
136	𑌕	aim perumvaṛi	5297	five big way	ஐம் பெருவழி
153	𑌕	poruḷ, poral, poril	4544, 4555, 4558	object/goods, town, earth/country/district	பொருள், பொறல், பொறில்
155	𑌕	ampi	177	boat, raft, ship	அம்பி
211	𑌕	anuppu (ampu)	329 (178)	send	அனுப்பு, அன்பு
83	𑌕	iṛappan, iṛappu	501	death	இறப்பு
50	𑌕	āṭu	5152	goat	ஆத்து, ஆடு
124	𑌕	ēr	2815	plough	ஏர்
125	𑌕	eru	863	full, strong	எறு
126	𑌕	inai	457	join, unite, mingle	இணை
161	𑌕	vilaku	5423	diverge	விலகு
47	𑌕	aṛan	204	squink, law-abiding, just	அறண், அரணை

M77 Sign	Glyph	Syllable	DED	Description	Tamil
48	𑌵	nal-aṛan, aṛan-nal-	-	good behavior	நல் அறன், அறநல்-
113	(𑌵𑌵)	viḷai-ñālam	5437, 2913	fertile land	விளை நாலம்
415	𑌵𑌵	mu-pala	7-	important many	முப்பல
171	𑌵	nil-(v)anji, nilai	-	stable	நில்வஞ்சி, நிலை
?	𑌵	nal-inai, nāl-inai	-	good joining, joining four	நல்லிணை, நாலிணை
49	𑌵	kula	1829	generation, geneology	குலம்
51	𑌵	māru, māran, mu-kula-iru-māran	4834	reliable third generation barter (showing one's back)	மாறு, மாறன், முக்குல மும்மாறனார்
302	𑌵	mārral	4834	exchange	மாற்றல்
137	𑌵	cēr, cēri	2814, 207	join, union, assemblage, hamlet	சேர், சேரி
140	𑌵	nal-iru-cēri	-	good, strong assemblage	நல்லிருச்சேரி
141	𑌵	cēri-vaṛi	-	road to assemblage	சேரிவழி
142	𑌵	cēri-vaṛi-anjih		road to assemblage resting place	சேரிவழிவஞ்சி
129	𑌵	koḷ	2151	seize, acquire	கொள்
130	𑌵	koḷal	2151	exchange, buy/sell	கொள்ளல், கொள்முதல்
148	𑌵	cērukoḷ	5297, 2151	exchange, buy/sell	சேர்ந்துகொள்
237	𑌵	mutal	4951	base, foot, stump	முதல்
304	𑌵	vil, viḷ	5422, 5421, 5432, 5433	bow, call out, sell	வில்
305	𑌵	viḷai	5437	productive, mature	விளை
127	𑌵	alaku, alanku, aragu	239, 240, 246, 255	beak, beauty, grains of paddy	அலகு, அழகு
306	𑌵	aṛaku-vilam	-	good home	அழகு ஈஇல்லம்
307	𑌵	viḷampu	5433, 5434	proclaim openly, serve food	விளம்பு
17	𑌵	villavan	5422	archer	வில்லவன்
28	𑌵	viḷampan	5434	one who	விளம்பன்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
				superintends the distribution	
310	𑌵	vila-vila	5424	tremble with fear	விலவில
397	𑌶	aṇi, aṇiyal, maṇi-	116, 4672	jewel, pearl necklace	அணி, அணியல், மணி, முத்து மாலை
398	𑌷	peru-aṇi(yal)	116	big pearl necklace	பெரு அணி
377	𑌸	nal-aṇi-pala	-	many good pearl necklaces	நல் அணி பல
233	𑌹	mumalai	-	three mountain range	மும்மலை
235	𑌺	mumalai-vēl	-	three mountain hunter	மும்மலை வேல்
180	𑌻	koṭṭu, koṭṭam	2063, 2064, 2066	pour, sting	கொட்டு (தேன்), கொட்டம்
181	𑌼	koṭṭu	2063, 2064	pour, sting	கொட்டு
169	𑌽	nilam	3676	land, ricefield	நிலம்
171	𑌾	nilai	3675	firm, stable	நிலை
173	𑌿	irunilai	3675	very firm, stable	இருநிலை
174	𑍀	iru-nilam	481, 3676	great/vast land	இருநிலம்
88	𑍁	nal-iru	3610, 480	fine life	நல்லிரு
176	𑍂	vanjī, anjih, añcal	5265, 56, 54	paddy, rice, to take on shoulder, resting place	வஞ்சி, அஞ்சி, அஞ்சல்
166	𑍃	vēl-vanjī	-	hunter's lair	வேல்வஞ்சி
249	𑍄	māṭṭu	4801, 4802	fasten, put in, fasten, hook, kindle, fire	மாட்டு
253	𑍅	māṭṭal	4802	necklace	மாட்டல்
252	𑍆	mār̥ram (māṭṭu + mu)	4834	exchange, barter	மாற்றம்
182	𑍇	mūtai (mū + iṭai)	4954	long under cultivation, mature	மூதை
178	𑍈	kalappai, kalam	1304	plough, vessel, ship	கலப்பை, கலம்
323	𑍉	il, ila	494, 497	non-existence, leaf	இல
325	𑍊	ila	497	leaf	இல
326	𑍋	ilai, iḷai	497, 496, 513	leaf, young	இலை, இலஞ்சி
327	𑍌	iḷavar̥ian, iḷaivar̥ian	-	horticulturalist?	இலைவழியான்

M77 Sign	Glyph	Syllable	DED	Description	Tamil
76	𑌕	cē, cēval	1931, 2818	red, bronze, cock	சே, செம்மை, சேவல்
311	𑌖	yār, eril	5156	harp, music, beauty	யாழ், எழில், இசை
400	𑌗	nuṛan	3714, 3715	penetrate, stitch	நுழ்-, நுழன், நுழம்பு, நுளம்பு
219	𑌘	tai (ta + kaccai)	3473	sew, stitch	தை
214	𑌙	irutai	481, 3473	strong stitch, good tailor	இருதை
?	𑌚	cī, cīpu, cil, calli	2599, 2622, 1577, 2382	cleanse, wooden peg, splinter	சீ, சிப்பு, சில்
240	𑌛	cil	1577	small	சில்
241	𑌜	ciṛa	2589	eminent, illustrious	சிற-
381	𑌝	ciṛappu	2589	eminent, illustrious	சிறப்பு
256	𑌞	nērciṛa	3772	just and eminent	நேர்சிற
266	𑌟	nērciṛa-kō	2177	just and eminent leader	நேர்சிற கோ
215	𑌠	ciṛuttai	2590	panther	சிறுத்தை
258	𑌡	cīrmai	2624	excellence, greatness	சீர்மை
257	𑌢	cutti, cuttiyal	2668	small hammer	சுத்தி, சுத்தியல்
259	𑌣	cutti, cuttiyal	2668	small hammer	சுத்தி, சுத்தியல்
192	𑌤	paḷli	4018	hamlet, herdsman's village	பள்ளி
193	𑌥	perum-puli	4307, 4411	big tiger	பெரும்புலி
321	𑌦	ñāṇ	2908	marriage string, necklace	நாண்
322	𑌧	nēññil	2907	plogh-shaft	நென்னில்
367	𑌨	nānan	2908	yarn maker	நாணன்
82	𑌩	tarupu	3142, 3169	to join together, amass (wealth)	தறுப்பு (தாரா - வாத்து)
202	𑌪	mā-	4786	up	மா-

M77 Sign	Glyph	Syllable	DED	Description	Tamil
247		caṭṭam	2304	frame, mould	சட்டம்
341		uṟu	689	harrow	உழு (பரப்பு, பரம்பு)
177		nal-mutal, nalāl	-	good chief, good worker, hard worker	நல்முதல், நல்லாள்
409		nan-nil	3588	Good standing	நன்னில்
365		viri	5411	spread, expand, blossom	விரி
190		pālaiyam	4117	army camp, village surrounded by hillocks	பாளையம்
189		toṭṭi, tōṭṭi	3485, 3547	fence, rake	தொட்டி, தோட்டி
191		toṭṭil	3486	cradle	தொட்டில்
202		mēṭṭu, mēḍu, metta	5058, 5069	height, eminence, hillock, upper storey, storied house	மேட்டு, மேடு, மெத்த
203		peru-mēṭṭu, peru-mēḍu, peru-metta	5058, 5069	height, eminence, hillock, upper storey, storied house	பெருமேட்டு, பெருமேடு, பெருமெத்த
188		mett-eṇal	5070	gentleness	பெத்தெனல்
366		utaḷ	610	goat	உதல்
















260 Logo-synonyms

M77 Signs	Glyphs	Syllable	DED	Description	Tamil
37, 27, 293		valaiyan	5288	trapper	வலையன்
230, 233, 89		mūmalai	-	tripple mountain	மூமலை
*345		mūmalai	-	tripple mountain town	மூமலையூர்
87, 124, 125		iru, ēr, eṟu	481, 2815, 863	vast, plough, full/complete	இரு, ஏர், எறு

* - sometimes used as short form of mūmalai in mūmalai-ūr.

Common phrases

Here we list multiple logos (mostly pairs and triplets) that commonly occur together in IVC. We also list a few non-aglutinative entangled glyphs which we try to describe them as complex mixed states.

M77 Signs	Glyph	Syllable	DED	Description	Tamil
321-336		uṭaṇ-ñāṇ	2908	marriage	உடன் நாண் (உடன்தை)
	Sign-336  also has ideographic mortar & pestle marriage association as well				
176-321-336		uṭaṇ-ñāṇ-anjih	2908	marriage hall	உடன் நாண் அஞ்சி
148	 = $\mathbb{X} + \checkmark$	maṛukoḷal, cērkoḷal	5297, 2151	barter, exchange, buy/sell	மாறுகொளல், சேர்ந்துகொளல்
12-124		ēr-vuṛavan	-	farmer	ஏர் உழவன்
169-124		ēr-nilam	-	farm land	ஏர் நிலம்
113		viḷai-nallam	5437-3613	cultivable rich soil	விளை நல்லம்
130-51		maṛu-koḷal, mu-kula-iru-māran-koḷal	-	barter	மாற்று கொள்
402-267		koṭa-nāṭu	-	herder country	கொட நாடு
402-267		valaiyan-nāṭu	-	trapper's country	வலையன் நாடு
402-76		cē-nāṭu	-	red country, bronze country	சே நாடு
67-65		peru-kanni-kondu	-	with big vehicle	பெருங்கன்னி கொண்டு
59-67		konda-kal	-	bullock cart	கொண்டா கல், கோண்ட கல், மாட்டு வண்டி
59-67		peru-konda-kal	-	big bullock cart	பெரு கோண்ட கல், பெரு மாட்டு வண்டி
307-379-176		pammu-vilambu-anji	-	bow stringer's resting place	பம்மு வில்லம்பு அஞ்சி
402-379-319		mura-pammu-nadu	-	yarn twisting country	முறபம்மு நாடு
342-379-		perum.aṇi-	-	big necklace	பெரும் அணி பம்மூர்

M77 Signs	Glyph	Syllable	DED	Description	Tamil
398		pammu-ūr		maker's town	
372 = 342+400+ 397+162	𐌛𐌚 = 𐌛𐌚𐌛𐌚	vēl-aṇi-nuṛan-ūr	-	town with hunters, pearl and cloth workers	வேல்திரள்நுழனூர்
194 = 342+400+ 397+162	𐌛𐌚 = 𐌛𐌚𐌛𐌚	mu-iru-mēl-per-ul	-	the mighty mel-perul	மூவிரு மேல்பொருள்
96-409	𐌛𐌚 𐌛𐌚	nannilai (nannu-nil-ai)	3588	amiable	நன்னிலை
94-409	𐌛𐌚 𐌛𐌚	nanniral (nannu-niral)	3672, 3673	make orderly	நன்னிரல்
350	𐌛𐌚	vellālar	5507	agriculturalist	வெள்ளாளர்
315-108	𐌛𐌚𐌚𐌚𐌚𐌚	aṛu-kuṭi-ēru		river flooding houses	ஆறு குடிஏறு

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Glyphs grouped under categories

A word of caution must be mentioned here that since these are primarily syllables, their actual use in a text may not correlate to below category.

Description	M77 Signs	Glyphs	Tamil
Activity-based countries	261, 391, 162, 245, 12, 326, 400, 311	𐌛, 𐌛, 𐌛, 𐌛, 𐌛, 𐌛, 𐌛, 𐌛	கோவன், பல்லவன், வலையன், தட்டான், உழவன், இலையன், நுழம்பன், பானன்
Farming: farmer, farm town	12, 15, 178, 124, 341	𐌛, 𐌛, 𐌛, 𐌛, 𐌛	உழவன், உழவூர், கலப்பை, ஏர், உழு
Horticulture: leaf, flower	326, 54	𐌛, 𐌛	செடி, பூ
Hunting: trapping, spear	35, 293, 162	𐌛, 𐌛, 𐌛	வலையன், வலையன், வேலன்
Cattle farming: herding and selling	30, 301	𐌛, 𐌛, 𐌛, 𐌛	கோ, கோட்டை, கோவன், இடையன்
Carpentry and metallurgy: metal and wood work	245	𐌛	தட்டி (தட்டான்)
Tayloring: stitching	400, 219, 182	𐌛, 𐌛, 𐌛	நுழல், தை, அணி
Honey gathering	180	𐌛	கொட்டு தேன்
Singing: harp, musician	311, 31	𐌛, 𐌛	யாழ், பானன்
Trade: barter, buy/sell	51, 130	𐌛, 𐌛, 𐌛, 𐌛, 𐌛	மாறன், மாற்று, கொள், கொள்ளல், மாற்றல், சேர்ந்துகொள்ளல்
Transportation: ship,	59, 65, 70, 72,	𐌛, 𐌛, 𐌛, 𐌛, 𐌛, 𐌛	கன்னி, பெருங்கன்னி, கல், கொல்,

Description	M77 Signs	Glyphs	Tamil
boat, raft, manual cart, bullock cart, boat	67, 211		கொண்ட, அம்பி
Movement: goods, send	153, 155	↑, ↑	பொருள்/பெருமுதல், அனுப்பு

Fish signs and it's varied manifestations

270 If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is “ka” and not “ma” or “mi”. We know that the fish sign is the most frequent in Indus script, so the obvious Turing’s not so enigmatic result is that the fish sign must start with “ka” and we found “kanni” is probably more feasible. However, our result “kanni” is independent of it and was inspired by M.V.Bhaskar’s interpretation (personal communication) that the “Garial” (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that “kanni” is a term used commonly in earlier times for boat or any vehicle. The analogy could be that “kanni” refering to a women carrying children or it could be that the boat itself was driven by women in those days. However, this analogy is not without it’s difficulty. The word “kaṇṇi” refered in modern Tamil to be a maiden is without any support in DED [1]. The only support comes the word “kaṇi” according to DED 1408 is “tender”, “love”, “devotion” etc., and so is “kātal” DED 1445 - “love”, “affection”, “lust” etc. From not so mystical angle it could be just derived from “kaṇ” DED 1159 “eye”, “peacock’s tail”, probably leading to a mystical euphemism. Support from another quarter is “traveling places” come from DED 1443 “kāṇ” – “to see”, DED 1161 “kaṇ” – “place”, DED 1166 “kaṇai” - “arrow”, and DED 1109 “kaṭa” - “to move”. The interpretation that it is “kaṇṇi” is reinforced by other evidences like sign-63 “kaṇṇi-pori”, where it is meant as a “snare” DED 1183+4538.

Assuming that sign-59 𑀓 is “kaṇṇi”, it could mean any of these things: vehicle, boat, cart, trap, trapper, soft, tender etc. We will show lines of text that seem to provide such evidences, but before that we decide a few variants of fish sign and phrases:

Standalone fish signs

M77 Sign	Glyph	Syllable	DED	Description	Tamil
59	𑀓	kaṇ, kaṇṇi	1408, 1109, 1183, 1159	boat, bamboo raft, soft, trapping	கண், கண்ணி
72	𑀓	kōl	2238	boat, raft	கோல்
70	𑀓	kāl	1483	cart	கால்
65	𑀓	peru-kaṇṇi	-	big boat	பெருங்கண்ணி
67	𑀓	kondū, kōnda, gōnde	2053, 2216	bull, with	கொடு (கொண்டு), கோண்டே, கொண்டே, கொண்ட

290 **Fish sign phrases**

M77 Signs	Glyph	Syllable	DED	Description	Tamil
67-65	𐑦𐑦	peru-kanni-kondu	-	with big vehicle	பெருங்கன்னி கொண்டு
70-67	𐑦𐑦	kondā-kāl	-	bullock cart	கொண்டா கல், கோண்ட கல், மாட்டு வண்டி
70-67-65	𐑦𐑦𐑦	peru.kanni-kondā-kāl	-	big bullock cart	பெருகன்னி கோண்ட கல், பெரு மாட்டு வண்டி
72-67	𐑦𐑦	kondā-kōl	-	bullock raft?	கொண்டா கோல்
59-328	𐑦𐑵	u(ka)-kanni	559, 563	boat rising in waves	யுக கன்னி

Reading lines of text with fish sign

Sample line 1 (kanni = trapper)

𐑦 𐑵 𐑦 |

mutal-vilampan-mu.malai-kanni

முதல்-விலம்பன்-மும்மலை-கன்னி

Semantics:

295 Chief archer, an expert trapper of three mountains

Sample line 2 (kanni = transport vehicle)

↑ 𐑦 𐑵

nilai-kanni-anupu

நிலை-கன்னி-அனுப்பு

Semantics:

(Please) sends (goods) by a stable boat/raft/cart

Sample line 3 (kanni = boat/raft)

↑ 𐑦 𐑦 𐑦 𐑦 || 𐑵 𐑵

palla-ar-iru-kanni-kōl-velan-ūr-anupu

பல்லர் இரு கன்னி: கோல் (மூலம்) வேலனூர் அனுப்பு

300 **Semantics:**
Elephant town turthful kind man: sends (goods) by boat to hunter’s town

Agriculture and it’s related signs

M77 Sign	Glyph	Syllable	DED	Description	Tamil
12	𑌒	uṛavan	688	farmer	உழவன்
13	𑌓	uṛavāḷ	688	farm worker	உழவாள்
14	𑌔	per-uṛavan	688	big farmer	பேர் உழவன்
15	𑌕	uṛavūr	688	working, farming town	உழவூர்
112	𑌖	ñālam, nallam	2913, 3613	land, fertile black-soil	நாலம், நல்லம்
169	𑌗	nilam	3676	land, ricefield	நிலம்
169-112	𑌘	ñālam-nilam	2913-3676	fertile land, ricefield	நாலம் நிலம், நல்லம் நிலம்
113	(𑌙)	viḷai-ñālam	5437, 2913	cultivated land	விளை நாலம்
389	𑌚	pañ-nilam	3837	ploughed land	பண்ணிலம்
178	𑌛	kalappai	1304	plough	கலப்பை
124	𑌜	ēr	2815	plough	கலப்பை
341	𑌝	uṛu	689	harrow	உழு (பரப்பு, பரம்பு)
176	𑌞	vanji	5265, 56, 55	paddy, rice	வஞ்சி
412	𑌟	nāṇkuṛu	2906	earthworm	நாண்குழு

Franklin Southworth [6] work on connection between rice cultivation and Dravidian language shows how vanjī is related to rice:

305 “vari-(n)ci (with variants *vari, *varici, *varinci) ‘rice, paddy’ DED 5265 can be reconstructed for Proto-Peninsular Dravidian ... It is the source of the word for ‘paddy’—i.e., rice in the field or after harvesting and threshing, either husked or unhusked, but not yet cooked—in most of the modern Peninsular Dravidian languages. This word may be connected to the Elamite bar ‘seed’—though there is some doubt, as the phonetic correspondences are not regular. A related form, *ari-ci/ki, with
310 variants ari, arici, akki, arki (the last two ← *ariki) DED 215”

The Indus barter exchange system

We only illustrate the key points here. The local barter happens in the undocumented unorganized sector at the cross-roads (𑌘), in what is termed as “cantai” (சந்தை) in modern Tamil. The exchange is abstracted by the symbol 𑌘 and the barter mediated by 𑌙 (maran?), who is usually qualified by great reliable ancestary (flowery self-praise by the system). The exchange is done by symbol 𑌚 (kol, the dagger of exchange) and 𑌘 (an abstraction of the cross-road, 𑌘). Most of the script pertains to official barter transactions of Indus, which are really instructions of transporation mode and the origin/destination. The clitics like 𑌛 (M77-99) orchestrate the sentence structure of the lines of the seals. An highly compressed form of information exchange mechanism is enabled by the drsastic

320 use of poly-semantic logo-syllabic script with each of these logo-syllables having many semantic possibilities with high degree of pun. This is so deeply wedded to Indus culture and mode of exchange that the deciphering of it has taken so long. The skills of bronze-age artisans is in full display here with those hundreds of poly-semantic logo-syllables crafted and designed with care to work in those small spaces available in the seals. What is interesting that the deeply mysterious
 325 swastic symbol (M77-148) is now understood as the mundane:

卐 = X + √ = cērukoḷ = சேர்ந்துகொள்

i.e., declaration of an important exchange, which is usually followed by drum beats '𑌶'. The drum beats are also a way to invite more people to the square for exchange (at cross-roads).

Relative volume of trade

330 We consider the absolute occurrence numbers in the text and also the association to the right of sign no. 99 𑌶. If we assume that what precedes (to the right of) sign. 99 𑌶 is the sender of goods then we get the following data:

Glyph	Description	No. occurrences	Forward transactions
𑌶	Cattle	369	290
𑌷	Ivory	182	82
𑌸	Hunting and trapping	130	61
𑌹	Agriculture	225	18
𑌺	Honey	44	18
𑌻	Elephant herding?	15	10
𑌼	Cross-road	41	8
𑌽	Tailoring	14	4
𑌾	Jewellery	12	3

Among 634 occurrences in IVC text with sign no. 99, assuming that what comes to it's right is the
 335 region that is sending commodities to the other regions, we can summarize that cattle and agriculture were the dominant activities, closely followed by carpentry and elephant-based products. Hunting, honey-gathering, fishing, carpentry, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC. Hunting, honey-gathering, fishing, carpentry, metallurgy, weaving and stitching were the other
 340 important activities that created products participating in the organized barter system of IVC.

Class structure of IVC

It seems from the table above that the cattle herders had the dominant trade surplus and probably the agriculturists had the highest trade deficit. Sign-41 𐀭 kīrān (DED 1621) கீழான் refers to a poor person and studying his concordance we see that he is strongly associated with sign-137 𐀭 cēri (DED 207) சேரி, a place where many people assemble, associated in modern terms with the hut dwellments or slums in cities. It is quite surprising that this association has remained true for 5000 years! It is also noted that sign-41 𐀭 (kīrān) has atleast one association with all professions, except cattle herding (sign-267 𐀭). So it is clear that there is a class structure associated with IVC which puts cattle-herders (𐀭) at the top.

350 Praise heaped on the farmer

The barter system's accumualtion of wealth by the ruling elite (sign-30 𐀭 “kovan”), accumulated in store-houses (sign-267 𐀭 “koṭṭa”) necessitates a rhetoric of praise on the toiling farmer (sign-12 𐀭 “vuṇavan”) like:

M77 signs	Glyphs	Syllable	Tamil	Description
12-75	𐀭 𐀭	peru.mu.kanni-vuṇavan	பெரும்முக்கன்னி உழவன்	Enormously mature and soft farmer
12-2-86	𐀭 𐀭 |	mutal-kāvalan-vuṇavan	முதன்மை காவலன் உழவன்	First guardian farmer
12-325-86	𐀭 𐀭 |	mutal-ilai-vuṇavan	முன்னிலை உழவன்	The foremost farmer

355 Such eulogy of farmer and farming has continued even 2000 years after IVC culture in Thirukkural:
Kural 1031: Howe'er they roam, the world must follow still the plougher's team;
Kural 1032: The ploughers are the linch-pin of the world; they bear.

Frequency of adjectives of towns

Adjectives of towns	Syllable	Frequency	𐀭* Frequency	𐀭* Frequency	Description	Tamil
𐀭	nilam	225	47	18	land	நிலம்
𐀭	vēl	196	40	8	lance	வேல்
𐀭	nal-aran	168	114	0	dood morals	நல் அறன்
𐀭	valaiyan	130	14	54	trapper	வலையன்
𐀭	vēlu	117	112	0	hunter's town	வேலூர்
𐀭	vēlan	104	93	0	hunter	வேலன்
𐀭	arai	87	34	0	godown	அறை
𐀭	nal-vari	87	44	1	cross-road	நால்வழி
𐀭	valai	80	37	7	net	வலை
𐀭	vari	35	32	0	road	வழி

Adjectives of towns	Syllable	Frequency	𑌵* Frequency	𑌶* Frequency	Description	Tamil
𑌵	ce	32	32	0	bronze town	செம்பூர்
𑌶	peru-vari	35	23	0	big road	பெருவழியூர்
𑌷	puli	25	21	0	tiger country	புலி
𑌸	tatti	134	70	6	smithy/carpenter	தட்டி
𑌹	er	78	16	0	plough	ஏர்
𑌺	iru-valai	51	28	0	strong net	இருவலை
𑌻	tai	129	40	9	tailor	தை
𑌼	ilai	32	18	0	horticulturist	இலை
𑌽	vaalai-kanni	13	12	0	fishing	கன்னி வலை
𑌾	nalnellal	61	14	8	good farmer	நல்நெல்லாளர்
𑌿	vilai-nallam	17	15	0	fertile rich land	விளை நல்லம்
𑍀	mel	56	14	2	uptown	மேல்
𑍁	mu.iru.mel .per.ul	56	27	1	mighty uptown	மூவிருமேல் பொருள்

Other adjectives (praise) and their frequencies

Adjective	Syllable	Frequency	Description	Tamil
𑌵	nal-aran	168	good moral	நல் அறண்
𑍁	mu.iru.mel.per.ul	56	mature-truthful- all-mighty	மூவிருமேல்பொருள்
𑍂	mutal	143	chief, foremost,	முதலாம், முதலவன்
𑍃	mū	300	mature	மூ-
𑍄	alaku	47	beauty, unperturbed	அழகு, அலங்கா
𑍅	nilai	130	firm, stable	நிலை
𑍆	iru-nilai	38	very firm, stable	இருநிலை

Postpositions and their frequencies

365 This is the equivalent of prepositions in English, but in Tamil they are post-positions and not pre-positions.

M77 sign	Glyph	Frequency	Syllable	Description	Tamil
336	𑍇	229	utan	with, together,	உடன்

M77 sign	Glyph	Frequency	Syllable	Description	Tamil
				agreement	
99/100	π	663	-ar	it's	-ஆர்
123	ʹ	189	-ar	it's	-ஆர்
97/98	τ	174	-il	-in	-இன்

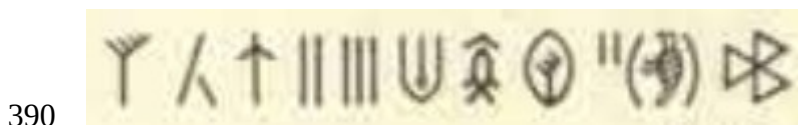
Broad observations

One of the surprising observation in this decipherment is that almost no individual identities like personal names are found in the text. All trade transactions are from one collective identity like country, village/town to another country, village/town. Individuals are extolled within the collective identity of farmers, workers, etc. There are however, strong leadership role identities like chief “mutalvan”, “peru(m)-kanni”, “mu-vēlan”, “iru-velan” etc. It seems that there are store houses where the items are sent and dispersed through some social mechanism of distribution. It seems that the distribution process could be related to sign-37 ∅ “viḷampu” (DED 5434) and sign-28, ∅ “viḷampan” seems more like the supervisor of distribution of goods. Sign-17 ✕ (villavan, villōṇ) seems like another protection officer cader maintaining law and order. Probably the sign-176 𐑦 “anjih” is a place each of the specialized workers like tailors, jewellery makers, carpenters, bronze workers, ivory workers, with each having a separate specialization location in town where others can reach them as targets for exchange. This tradition continues in many town in India even now, although in rapid decline with the arrival of multispeciality supermarkets.

Semantic reading

The whole exercise of decipherment will be meaningless gibberish if it doesn't lead to any to proper semantic outcomes. We have already seen a range of professions, towns and trade symbols that we are able derive from the exercise. We will now read a few lines using the above syllabary that we have declared.

1. M77 Line 1006-100101



NFM font equivalent rendering:

π ʹ τ || ||| μ 𐑦 𐑦 (𐑦) 𐑦

Very clever trapper vēlappan of the triple mountain: sends by boat along the big river with care to the tiller of land

பறவைகளை வேட்டையாடி விற்க்கும் மும்மலையார் வேலப்பன்: பெருங்கண்ணி உடன் முன்னிருந்து அம்பி (படகு) ஏர் உழும் நிலத்துக்கு

The break-up steps:

π(𐑦): valai-puri (வலை-புரி) mu-malai-ar (மும்மலை-யார்)

①: velappa (வேலப்ப)

400 ②③: peru-kaṇ-uṭan (பெருங்கண் உடன்)

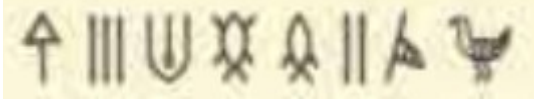
④⑤⑥: mu-iru (மூ-இரு)

⑦: ambi (அம்பி)

⑧⑨: ēr-nilam (ஏர் நிலம்)

2. M77 Line 1008-100101

405



NFM font equivalent rendering:

①②③④⑤⑥⑦⑧

Bronze countryman: sends by bullock-cart to triple mountain

410 சேவல் நாட்டார்: மாட்டு வண்டி உடன் மும்மலை(க்கு) அனுப்பு(கிறார்)

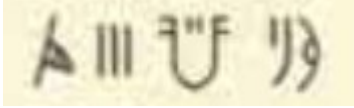
The break-up steps:

⑧⑨: cēval-naṭṭ-ar (சேவல் நாட்டார்)

②③④: kanni-konṭa-uṭan (கன்னி கொண்ட உடன்)

①②③: mu-anupu (மூ-அனுப்பு)

415 3. M77 Line 1029-100101



NFM font equivalent rendering:

①②③④⑤

Hunter/trapper townsman's three-mountain country

420 வேட்டையாடி வலை பிடிக்கும் ஊர் மும்மலை நாடு

The break-up steps:

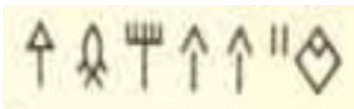
⑤⑥: valai-an-in (வலையனின்)

⑦⑧: ur-ār (ஊரார்)

①②③: mu-nāṭu (மூநாடு)

425

4. M77 Line 1032-100101



NFM font equivalent rendering:

△𑌵𑌶𑌷𑌸𑌹𑌺𑌻

- 430 Cattle country: prized goods sent by stable boat
கோட்டுரார்: பெருமுதல் பொருள் நிலை கன்னியில் அனுப்பு(கிறார்)

The break-up steps:

𑌺𑌻: koṭ-ūr (கோட்டுரார்)

𑌵𑌶: peru.mutal-poruḷ (பெருமுதல் பொருள்)

- 435 △𑌵𑌶: nilai-kanni-anuppu (நிலை கன்னி அனுப்பு)

5. M77 Line 1067-100101



NFM font equivalent rendering:

𑌺𑌻𑌵𑌶𑌷𑌸

- 440 The pearl necklaces are being bartered in cattle country
அணியல் மாற்றம் கொட நாட்டில்

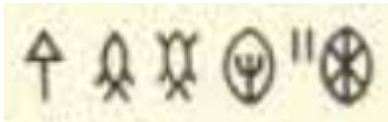
The break-up steps:

𑌵: aṇiyal (அணியல்)

𑌷: marṛam (மாற்றம்)

- 445 𑌺𑌻𑌵: koda-nāṭu-il (கொடநாட்டில்)

6. M77 Line 1088-100101



NFM font equivalent rendering:

- 450 △𑌵𑌶𑌷𑌸𑌹𑌺

Elephant country velappan: sends by bullock cart
பல்லார் வேலப்பன்: மாட்டு வண்டியில் அனுப்பு(கிறார்)

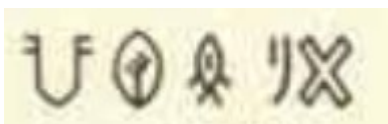
The break-up steps:

𑌹𑌺𑌻: palla-ar-velappa (பல்லார் வேலப்பன்)

- 455]-: konde-kanni (கொண்டே கன்னி)

△: anuppu (அனுப்பு)

7. M77 Line 1095-100101



NFM font equivalent rendering:

460 𑌕𑌖𑌗𑌘𑌙

Cross-roads countryman sends cart to velappa town

நால்வழியார் வண்டி வேலப்ப ஊர்(க்கு)

The break-up steps:

𑌙: nal-vari (நால்வழியில்)

465 𑌗: kāl (கால்)

𑌕: velappa-ur (வேலப்ப ஊர்)

Pluripotency

The fish sign-59 𑌕 kanni takes the values of boat, craft, vehicle, bullock cart in these cases. We have also observed that in some other case:

𑌕 𑌖 𑌗 |

that the sign-59 𑌕 kanni takes the value of “trapper” or “trapping”.

From these readings we also obtained:

ampu ≈ anuppu ≈ ambi

475 kondā ≈ konda




The syllables not only took different semantic values from the standalone values but they also took a deformed phonemic values, a key aspect of Indus writing system that enables pluripotency in both form and content in order increase coverage with only a few signs, thus increasing literacy.

480 Further readings





The above section considered just seven sentences in IVC text, but there are several thousand lines of text in M77 [2] and we will be pursuing deciphering them over time. Few pages have already been deciphered from the lines of text available in Mahadevan's work [2]. The results will be reported in online version tracking system, as and when we decipher them [7].



485 Graphics and text: a show and tell

In this document we decipher the text embedded along with illustrated scene in some of the IVC tablets. We have selected only the ones that have certain dramatic element in it.

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate V - 98		𑀮𑀺𑀭𑀸𑀓𑀺𑀭𑀸	tallu-utai	push-kick	தள்ளு உதை
Plate V - 103		𑀮𑀺𑀭𑀸𑀓𑀺𑀭𑀸	ceru-kottu-tadu-iru	stop-fight	செருக்கொட்டு தடு-இரு
Plate V - 105		𑀮𑀺𑀭𑀸𑀓𑀺𑀭𑀸	iru-vilagar-kanni-anuppu	prevent fighting by sending guard	இரு-விலக்கார்- கன்னி-அனுப்பு

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate VI - 114		𑌕𑌃𑌕𑌃𑌕𑌃	mu-tāri-tai- kol-ūr-an	accept ancestral power transfer	முதாழிதை கொள் ஊரான்
Plate IV - 80		𑌕𑌃𑌕𑌃𑌕𑌃	nal.vari-yar- velan-kal- aru-ūr	Controller of cross-way Velan sending boat along the river in the town	நால்வழியார் வேலன் கல் ஆற்றுருர்
Plate IV - 81		𑌕𑌃𑌕𑌃𑌕𑌃	tan-tari- mu.ūr-kanni- ūr	Controller of many country transactions	தன்தாழி வேலப்ப முஞர் கன்னியூர்
Plate III - 55		𑌕𑌃𑌕𑌃𑌕𑌃	palla.kotta- ar-velan- kanni- anuppu-māṭi	Unity of seven (3+2+ 2) nation's Velan (controlling bureaucrat?): Elephant fort sending by vehicle to buffalo country	பல்லர் கோட்ட வேலன் கன்னி அனுப்பு மாடி/மாடு

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate III - 54		𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃	anjih.an- ūr-ar-mel-konda-ūr-an	Five-cross-way multi-storeyed rest-house for travellers	அஞ்சியன் ஊரார் மேல் கொண்ட ஊரான்
Plate III - 57		𑌕𑌃	mu-puli(malai)-velan-eṟuvanji	Three-mountain tiger country excellent rest-house for hunters	முப்புலி வேலன் எழுவஞ்சி
Plate III - 50		𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃	muvar-eṟuvanji-yar-ēr-ūr	Rhino country seal: Three-mountain rest-house to tiller's land	வலன் மூவன் வஞ்சியார்: ஏர் ஊர்
Plate III - 51		𑌕𑌃𑌕𑌃	palla-ar-māṭṭu-vel-ūr	Markhor country seal: Elephant country loads to hunter's town	பல்லர் மாட்டு வேலூர்

M77	Graphics	Glyphs	Syllables	Description	Tamil
Plate I - 18		புலையு	koṭa-ar-konda-para-iru-ūr	Elephant country (food): Cattle herder sending by bullock to messenger's town	கோட்டார்: கொண்ட பறையர் ஊர்
Line 1093		புலையு புலையு புலையு	konda ūr-tarupu-ūr velūr-ūr	Gathering of buffalo townsmen at Velūr town	கொண்ட ஊர் தறுப்பூர் வேலூர் ஊர்

Major countries depicted by animals in seals

This is another major category that is directly indicated by animals.

490 **Plate III -55 [2]**



495

Here we can see five major countries indicated branching from two unicorn motifs and here with two of them further branching into two subcategories.

The seal on the right is either calling for (or celebrating) bartering between five countries:

பு || ஐ (para-ar-ūr, பறையூர்)

500 calling for five nations to join in the barter system

சுசுசுசுசு

(cerukol, சேர்ந்துகொள்)

The animals that seem to indicate the five nations [4] in the seals are:

Markhor/Gaur (bison) ◇, Buffalo □, Elephant ⊕, Rhino ? and Tiger ✕.

505 Although all the skills and specialised skill centers (vanjih, 𑀓𑀲) are all distributed all over the towns and villages of all countries, in triple mountain tiger country (Afghanistan?) there seems to be preponderance of hunters, animal trappers and honey collectors.

A brief summary of the of the IVC writing system

510 The IVC system can be considered as a resolution of the contradiction arising between pure ideographic and pure syllabic system of writing. We were able to associate unique syllabic value to every sign. Although the ideographic system allows easy understanding of the base signs through a Dravidian root-word association, they also create a complex plethora of signs for the IVC writer to recognize and use. In order to reduce the number of signs needed, a pure syllable-based number system seems to have been used, which is affixed/prefixed/welded to the base sign to produce
515 agglutination of word-pieces. The core consonant backbone of the base is maintained in the agglutination process, but the affixes may retain only the front/middle/tail syllable, depending on whether it is affixed/infixes/prefixed, respectively. Although each sign signifies a syllable and not a concept or idea, an ideographic undercurrent remains strong throughout the IVC writing system, creating certain stability of the semantics of the writing system. It is also observed that certain
520 amount of arbitrariness is allowed during the agglutination process: deletion, modification or addition of vowels/glides. Glides are soft consonants that are added as binders for smooth phonetic transition between hard consonants. For proper understanding of practical Tamil grammar as it is spoken now one can consult Harold F. Schiffman [8], but one must not apply these grammar rules blindly to the IVC writing system, as 5000 years separate the present Dravidian languages and the
525 IVC languages.

Overlap with previous work

No work germinates on it's own; it usually germinates on a fertile ground laid down by others. There were many conjectures on this Indus writing system by Asko Parbola, Iravatham Mahadevan and Brian Wells. I will briefly outline some of them pointing out overlaps and differences. It all
530 started with the interpretation for fish sign as "mīn" by father Heras in 1930s [9]. This was reiterated with caution by Iravatham Mahadevan [10]. If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is "ka" and not "ma" or "mi". We know that the fish sign is the most frequent in Indus script, so the obvious Turing's not so enigmatic result is that the fish sign must start with "ka" and we found "kanni" is probably more feasible. However,
535 our result is independent of it and was inspired by M.V.Bhaskar's interpretation (personal communication) that the "Garial" (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that "kanni" is a term used commonly in earlier times for boat or any vehicle. This was probably dropped later on in Tamil literature. The same however continues in Indo-European tradition that associates feminine
540 gender to even a modern vehicle like train inflecting verb appropriately.

There were many interpretations by Asko Parbola and Mahadevan [11] on the M77 sign-342 𑀓𑀲, including "-an". MVB was quite critical of this being male-centric, an apt criticism, as he found no preponderance of male domination in IVC art. The interpretation of sign-1 𑀓𑀲 as "-an" has also been proposed by Bryan Wells [3] and then MVB's criticism can be cleverly overcome by stating that "-

545 an/-al” could have been sex-neutral term in those days and associating “-al” with feminine gender could have been a later invention by the male-dominant society (especially as “-al” has connotation with darkness and evil). On other proposals of Iravadham Mahadevan and Bryan Wells’s on numbers as being semantically numbers, we found no parallels in our interpretations. In fact, the numbers are probably the only signs that almost never reflected their standalone ideographic value.
550 This was indeed quite suprising for us, as we found almost no evidence for this. MVB has been quite radical in this interpretation, proposing that almost a new syllabic system can be conjured-up using just the numbers alone.

Yuri Knorozov [12] has also done extensive study of the IVC writing system and he has correctly identified numbers as syllables, with sign-86 | identified as “or”, || as “iru”, ||| as “mu”, |||| as “nal”, ||||| as “ai”. This is exactly as what we have deciphered here, although we consider sign-86 | as “mutal” and not “or”.

Bryan Wells’s work also proposes other possibilities like sign-358 𑌶 being closely related to the Hare’s ears and so proposing the syllable “ce” from “cevia”. The author is in full agreement with this proposal and in fact, both this and sign-76 𑌶 also evokes the same “ce” syllables. In the IVC
560 context of bronze-age, these have semantic connotations to “cembu” (bronze). Bryan Wells also proposed “kō” for sign-261 𑌶 and “kōṭa” for sign-267 𑌶. We are fully in agreement with these readings.

Ansumali Mukhopadhyay [13] studied the word for teeth, “pa l la” and it’s relationship to the ivory trade. The sign-391 𑌶 is here deciphered as “pa l la”, the elephant, an important sign in the
565 IVC, especially in relationship to the ivory trade. There could have been many more proposals that may have some overlap with our interpretations here. We would be glad to include them in our document as soon as we are made aware of them.

Farmer et al. [14] criticism that the average number of signs in a line are two short (on the average of between 4 and 5 signs) for any meaningful orchestration of a writing system is quite correct.
570 However, our decipherment points out that these lines of text are mostly **from/to** addresses with mode of transport indicated through fish and arrow signs in-between the **from** and **to** addresses. Sometimes the mode of transport is left out (or is implied) and the same could be true of the **to** address, which probably is implied from the context. There are also very short lines heaping praise on towns and their workers. In any case, writing in crisp and short messages is a tradition that has
575 continued for a long-time in Dravidian tradition, as established in Thirukkural, which is taught even now in schools of Tamilnadu.

Funding and Data availability statement

Partial funding was received from TNQ Foundation, Chennai while completing this work. All data required to access the scientific veracity of the work is available through the references cited at the
580 end of the text and through the open web portal: <https://github.com/Sukii/decipher-ivc>. Any other data or references cited can be provided on request.

Conflict of interest

Author would like to state that there is no conflict of interest in this paper.

Conclusions

585 First important study of the Dravidian family of languages was by Caldwell [15] in 1886. Recent studies indicate that the temporal origin of proto-Dravidian to be around 2500 BCE [16, 17], so it can be discerned that the Indus script could have been a major epicenter for the formation of the identity of Dravidian language family. We can even go ahead and conjecture that some aspects of Dravidian linguistic structure could have been a result of remoulding of languages of the Indus Valley Civilization into an agglutinative reformulation as contrained and evolved by the Indus script. 590 After the gradual decay of IVC, with southern migration of the population, the language could have radiated into the many branches of Dravidian family [16]. A detailed study of the decipherment and it's relationship to Dravidian morphology could provide further clarity on this feasibility.

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595 The decipherment became possible with the arrival of the splendid work by MVB [4]. This laid down the map that lead to all the linkage between graphics and the text, building this beautiful journey of discovery enabled by M.V. Bhaskar, with whom I have been working for the past several years. My learning in art, Brahmi and Indus Script derived from his interactions. Of course, all this work could not have been possible without the enormous efforts of Asko Parbola, Iravadham 600 Mahadevan, Bryan Wells and many others. Thanks are also due to Eugenia Vanina for enlightening me about works by Russian scholars on Dravidian languages and the Indus script, especially the collected works of Yuri Knorozov [12].

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